

Appln No. 10/535,317
Amdt date October 8, 2008
Reply to Office action of April 8, 2008

REMARKS/ARGUMENTS

In the Office action dated April 8, 2008, the Examiner rejected claims 1-2, 4, 6, 10, 15, and 17 under 35 U.S.C. 102(b) as allegedly anticipated by Park, et al., "Development of new Ni-based amorphous alloys containing no metalloid that have large undercooled liquid regions," *Scripta Materialia* 43 (2000) 109-114. However, applicant has canceled claims 1-5 and added new independent claim 36 reciting a glass forming alloy consisting essentially of an alloy having a Ni-Ti-Zr-Al-Cu composition. Park fails to teach or suggest a glass forming alloy consisting essentially of a Ni-Ti-Zr-Al-Cu composition. In particular, Park fails to teach or suggest an alloy including Cu. As such, new independent claim 36, and all claims dependent therefrom, including claims 6-13 and 27, are patentable over Park.

In rejecting claim 15 over Park, the examiner asserts that the formula recited in claim 15 does not require Cu, arguing that when x and y are 0, the alloy includes only Ni, Ti, Zr, Al and AM. However, the formula recited in claim 15 is $((\text{Ni}, \text{Cu})_{1-x}\text{TM}_x)_a((\text{Ti}, \text{Zr})_{1-y}\text{ETM}_y)_b(\text{Al}_{1-z}\text{AM}_z)_c$. When x and y are both 0, the remaining alloy is $(\text{Ni}, \text{Cu})_a(\text{Ti}, \text{Zr})_b(\text{Al}_{1-z}\text{AM}_z)_c$. As Cu is always present in the alloy recited in claim 15, even when x and y are 0, and as Park fails to teach or suggest the recited alloy including Cu, independent claim 15, and all claims dependent therefrom are patentable over Park.

The examiner also rejected claims 1, 2, 3-12, and 14-35 under 35 U.S.C. 103(a) as allegedly obvious over Li, et al. (TW Abstract of Patent Publication No. 458828B) either by itself or in combination with one or more of Kim, et al. (U.S. Patent No. 6,325,868) and Hayes (U.S. Patent Publication. No. 2002/0003013). However, applicant has canceled claim 1 and added new independent claim 36 reciting a Ni-Ti-Zr-Al-Cu alloy. In addition, independent claim 15 recites a $((\text{Ni}, \text{Cu})_{1-x}\text{TM}_x)_a((\text{Ti}, \text{Zr})_{1-y}\text{ETM}_y)_b(\text{Al}_{1-z}\text{AM}_z)_c$ alloy. Li fails to teach or suggest such alloys. In particular, Li fails to teach or suggest an alloy including Cu.

Moreover, applicant has amended independent claims 22 and 36 to recite a glass forming alloy "consisting essentially of" a Ni-Ti-Zr-Al-Cu alloy, and has amended independent claims 33 and 34 to depend from claim 15. The transitional phrase, "consisting essentially of," excludes

those materials that would materially affect the basic and novel characteristics of the claimed invention. MPEP § 2111.03. Li discloses an alloy having the formula $\text{Ni}_a\text{Zr}_b\text{Ti}_c\text{Al}_d\text{Sn}_e$. Similarly, Kim discloses alloys having either the formula $\text{Ni}_a(\text{Zr}_{1-x}\text{Ti}_x)_b\text{Si}_c$ or the formula $\text{Ni}_a(\text{Zr}_{1-x}\text{Ti}_x)_b\text{P}_c$. Hays also discloses alloys including additional metals, e.g. Be, Nb, Mg, Y and Li. The Sn in the Li alloy, the Si or P in the Kim alloys, and the additional metals in the Hays alloys would materially affect the basic and novel characteristics of the present invention. As none of Li, Kim or Hays, either alone or in combination teach or suggest an alloy consisting essentially of the recited composition, independent claim 36, and all claims dependent therefrom are patentable over Li, Kim and Hayes.

In addition, independent claims 15 and 36 both recite that the Ni is present in an amount ranging from 34 to 46 atomic percent. None of Li, Kim and Hayes teach or suggest such a feature, and providing Ni in the recited amount exhibits unexpected and desirable results. As shown in Table 1 of the present specification, pentiary Ni-based alloys with Ni present between 34 and 46 atomic percent achieve much higher critical casting thicknesses than those reported in any of the Li, Kim and Hayes references. Indeed, neither Li nor Hays describe a critical casting thickness, and Kim describes only a thickness of 1 mm (See Abstract and column 4, lines 19-21). According to Table 1, the claimed pentiary Ni-based alloys achieve critical casting thickness greater than 3mm, with many such alloys achieving thicknesses of 6mm, representing an improvement of up to 600% over the Kim reference. Given these unexpected results, independent claims 15 and 36, and all claims dependent therefrom, including claims 6-11, 13, 17, and 19, are patentable over Li, Kim and Hays.

Finally, applicant has amended the specification solely to correct minor, inadvertent typographical error. In particular, applicant has amended the generic formula $\text{Ni}_{100-a-b-c} \text{Ti}_a \text{Zr}_b \text{Al}_c \text{Cu}_d$, appearing in paragraphs 0035-0037, to read $\text{Ni}_{100-a-b-c-d} \text{Ti}_a \text{Zr}_b \text{Al}_c \text{Cu}_d$. The omission of "d" from this formula was inadvertent. Those of ordinary skill in the art looking at the specification and this formula would certainly understand that the atomic percentage of Ni, when calculated by subtracting the percentages of the remaining elements from 100, must subtract not only a, b and c, but also d. In other words, looking at the formula on page 3, those

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of ordinary skill in the art would readily recognize that the amount of Ni is 100 less the atomic percentages of each of the other elements in the formula, including a, b, c and d. Therefore, the amendments to the specification do not constitute new matter.

Claims 6-13, 15-20, 22, 25, 27, 29, 31, 33-34, and 36 remain pending in this application. By this amendment, applicant has amended the specification to correct minor inadvertent typographical errors, canceled claims 1-5, 14, 21, 23-24, 26, 28, 30, amended claims 6-13, 15, 22, 27, and 33-34, and added new claim 36. The amendments and new claim find full support in the original specification, claims and drawings, and no new matter is presented. In view of the above amendments and remarks, applicant submits that all of pending claims 6-13, 15-20, 22, 25, 27, 29, 31, 33-34, and 36 are in condition for allowance. Applicant therefore respectfully requests reconsideration and a timely indication of allowance. However, if there are any remaining issues that can be addressed by telephone, applicant invites the examiner to contact applicant's counsel at the number indicated below.

Respectfully submitted,
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